

Conceptual Examination of Bereiter's Educational Notion

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The purpose of this study was to investigate the Bereiter's educational notion and its applicability, conceptually and critically. The method of research was empirical applicability by means of which the essential components of the notion were formulated, criticized and verified, to see if it is applicable. In the study, primarily Bereiter's philosophical assumptions and his main educational ideas were categorized, reformulated and criticized. The results of the study showed that, although Bereiter's educational notion has a relatively consistent framework, it could be criticized and its practice in real situations may face difficulties. One of the major difficulties of his philosophical assumptions is his distinction between World two and three and its implication for correlation between mind and knowledge. In addition, the key problem of his educational idea is generalization of knowledge building as a task of all students. However, although his ideas rely on cognitive science as an interdisciplinary field, but he fails to specify how education could be informed by that field. The article concludes that, although Bereiter has appropriately shown the educational issues arising from folk theory, some of his ideas, like his focus on knowledge building rather than learning, seem to be impractical.

Keywords: philosophical assumptions, mind, knowledge, theory, practice, society and culture

Introduction

Many researchers have indicated that innovations and discoveries of 20th century are the results of development of new frameworks of thinking, understanding and creation of meaning (Palko, 2010). One of these emerging fields has been "cognitive science". Cognitive science is the inter-disciplinary study of mind and intelligence, embracing philosophy, psychology, artificial intelligence, neuroscience, linguistics and anthropology (Thagard, 2005), which has revealed further mysteries of human mind and brain. In recent decades, all dimensions of human life, including education, have been affected by this new field of knowledge.

It seems that three traditions have had impact on cognitive educational thoughts: symbol processing, cultural and social or situated cognition and constructivism (Gardenfors & Jhansson, 2005). Symbol processing criticized behaviourism and focused on representation and computation, and hence provided new educational thoughts by putting mind in the heart of educational activities. However, some of the thinkers being advocates of situated cognition, criticized their tenets by claiming that symbol processing tradition neglected the interaction of individuals with external world. According to this approach, meaning is constructed as a cultural product and cognition embraces action and interaction with others. As a result, anthropological views were considered by educators and completed the sketch of symbolic tradition. But, this traditions also faced

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new criticisms that human mind can cope with the situation, and therefore, cognition may not be completely situational. Therefore, a new approach was developed that a distinctive feature of human being is his/her ability to create conceptual artifacts and change the real world. Since the task of philosophy of education is to examine scientific theories based on their logical coherency, explaining power, inspiration and especially their practical capability, this study intends to answer the following two questions:

- (1) What are the Bereiter's philosophical assumptions and educational ideas?
- (2) Which of the criticisms of Bereiter's philosophical assumptions and educational ideas are relevant in terms of being feasible?

Methodology

To answer the above questions, two methods were utilized. To reformulate Bereiter's philosophical assumptions and educational ideas, the method of qualitative content analysis (Mayring, 2000) was used and his main works in the last two decades were analyzed, and then, empirical applicability method was utilized to critically examine the conceptual framework of his educational notion.

Bereiter's Philosophical Assumptions

The most important philosophical assumption of Bereiter consists of concept of mind, concept of knowledge, mind and knowledge relationship, knowledge work, knowledge society, progressive discourse, principled procedural knowledge and knowledge building. Some of which will be scrutinized in this article.

Concept of Mind

Bereiter believes that understanding is the character of cognitive structures and knowledge has a more complex and extended role to come through it (Bereiter & Scardamalia, 1992), hence, understanding, not only implies abilities and dispositions in relation to subject matters, but also is necessary for intelligent behavior.

Referring to cognitive scientists, he made note of the insufficiency of container metaphor, mental schemas and concepts networks. Bereiter (2002a) believed that understanding is the holistic feature of these schemas. He emphasized that if we consider cognition as the product of mind/brain, then, mind body problem might be vanished. However, he concluded that "We need a concept of mind, because we continually deal with mental phenomena at a systemic level" (Bereiter, 2002a, p. 19).

As cognitive scientists focus on mental models, cognitive educationists should verify the students' current understanding and provide them with experiences that could change their mental models. In general, according to his view, having mind means having cognitive system, the main function of which is to build knowledge.

Concept of Knowledge

Bereiter, in agreement with cognitive scientists, used an extended meaning of knowledge. He identified six kinds of expert knowledge: storable knowledge, implicit understanding, episodic knowledge, impressionistic knowledge, skill and regulative knowledge (Bereiter, 2002a, pp. 137-145). Thus, by this new definition of knowledge, he rejected the dichotomy of "declarative" and "procedural" knowledge.

One of the most important features of Bereiter's notion is its ontological foundation. He claimed that his theory could transfer World 2 to World 3. World 2 is the subjective world, comprised of the knowledge existing in the heads of people. World 3, roughly speaking, is the world of ideas (Bereiter, 2002b, pp. 11-34). He was in agreement with Popper (1972) who said,

I suggest that one day, we will have to revolutionize psychology by looking at the human mind as an organ for interacting with the objects of the third world; for understanding them, contributing to them, participating in them; and for bringing them to bear on the first world. (p. 156)

Translating this notion into an educational prescription leads naturally to thinking of World 3 as a workspace and of education as an entrance to it.

Mind and Knowledge Relationship

Bereiter (2002a) claimed, perhaps the main reason we need a more realistic theory of mind is, however, to get the mind disentangled from knowledge while obviously mind and knowledge are related together. In fact, by introducing the term “conceptual artifacts”, Bereiter (2002a) defined the state of knowledge and he believed that conceptual artifacts like other artifacts are human constructs and provide us with instruments to explain and predict. As conceptual artifacts belong to World 3, they have their own life, falsities, virtues, implications and applications that their creator could not foresee. Thus, what seems to him to be “An important point for a new theory of mind and knowledge is that deliberate effort to improve a body of knowledge is something quite rare in the world” (Bereiter, 2002a, p. 79).

Society and Culture

Bereiter (2002a, p. ix) stated that, “Here, we are in the information age” and to live in knowledge age (society), we should be amenable to receive the culture of knowledge creation, as the salient attribute of such society is to create knowledge as a main productive work. He stressed that what makes a knowledge society different from an industrial society is its working with conceptual artifacts. In this way, not just individual projects but the whole of schooling may be transformed, so that students are introduced into a knowledge creating culture which means, enabling them to work with ideas in design mode, the mode in which new knowledge is created.

Theory and Practice Relationship

There is no doubt that education is suffering from the gap between theory and practice. Although a number of disciplines (specially, educational psychology) have potential relevance with education and may be able to fill partly this gap, but as Hilgard (as cited in Bereiter, 2010) argued, educational psychology has been widely rejected by practitioners as having little practical value to offer. Bereiter and Scardamalia (2007) believed that educational practitioners have filled the gap between theory and practice by quasi-science. Nevertheless, what we have in education is a barrier, rather than a gap (Bereiter, 2009). Therefore, he hoped that learning sciences as an interdisciplinary field, sitting at the intersection of cognitive science, computer science and educational research will be lowering the barrier (Bereiter, 2010). In fact, he led us to cope with the barrier between theory and practice through principled procedural knowledge, defined as know-how combined with “know-why”.

The main points of Bereiter's philosophical assumptions can be seen in Table 1.

Criticism of Bereiter's Philosophical Assumptions

Bereiter, with emphasis on cognitive research, tries to replace folk psychology with cognitive approach. He believed that folk theory cannot meet the educational needs and challenges. He rejected, in fact, mind metaphor of folk theory: mind as a container and eluded from naming his idea as a theory, but called it a new way of thinking about mind. As such, Bereiter, in spite of being interested in interdisciplinary studies, adopted a physicalist approach and left philosophy and speculation out of the realm of mind studies.

Table 1

Bereiter's Philosophical Assumptions

	Philosophical components	Assumptions
1	Concept of mind	—Understanding mind based on brain functions —Having mind means having cognitive system
2	Concept of knowledge	—Knowledge as true and false beliefs —Rejection of dichotomy of declarative and procedural knowledge
3	Mind and knowledge relation	—Knowledge as a construct of mind: knowledge acquisition knowledge production knowledge improvement
4	Society and culture	—Knowledge age: knowledge society knowledge creation culture
5	Theory and practice relationship	—Principled procedural knowledge: dismiss of quasi scientific knowledge

He argued that educationists should pursue a methodology for studying mind that works properly in actual settings and tackles educational problems, appropriately. Although, cognitive science has contributed significantly to applied fields, such as economy or education, but putting the burden of philosophical problems on the shoulder of science would not be reasonable. In fact, philosophical problems cannot be solved just through a scientific approach, and therefore, it is not possible to reduce mind issue to brain functions or vice versa. In this regard, Shepard (2005, p. 330) reminded us that,

It is useful and perhaps necessary for educators to recognize the important distinction between two different sorts of explanation in respect to the development of mind. The first is scientific mind games... The second sort of explanation is an account of the various ways in which human beliefs and intentions are developed from the naive beliefs and unreasonable intentions of early childhood into the sophisticated and reasonable beliefs of adulthood. The former seems to be the task of neuro and cognitive science. The latter refers, at least in part, to the task of educators.

Stemhagen (2005) shared the worries of Sheppard, regarding the educational problems associated with the strict adoption of information processing theories. He also is skeptic of the possibility that science may render the mind fully understandable. However, he finds himself in the position of defending science, as one of the ways to understand the mind.

Bereiter adopted Popper's categorization of world and tried to conceptualize knowledge according to that category. He said "There is World 1, there is World 2, and there is Ultra—World 1, the world of truth, which it is the thinker's job to puzzle out, using clues from the physical world" (Bereiter, 2002a, p. 71). Thus, he contemplated knowledge as a conceptual artifact that belongs to the two worlds and stressed that other theories realized knowledge, just as a component of World 2, while his theory posits knowledge in World 3. However, as some philosophers (Davari-Ardakani, 2000) reminded us that there is no distinctive boundary between those worlds. Hence, although extended meaning of knowledge could obviate some limitations of education, recognizing distinction between knowledge related to World 2 and knowledge related World 3 would be difficult.

No modern philosopher of mind or epistemologist explicitly denies the relationship between knowledge, mind and education. Thus, Bereiter believed that "Understanding is a relation between the knower and an object of knowledge" (Bereiter, 2002a, p. 100). The object of knowledge, as a kind of conceptual artifact, belongs to World 3 and could be improved by knowledge worker. However, Bereiter's position is paradoxical.

On the one hand, he highlighted the role of knowledge in understanding, and on the other hand, tried to disentangle mind from knowledge for better thinking and creative knowledge building.

Although Bereiter has not endorsed the idea of “situated cognition”, but himself has used the concept of knowledge age or knowledge society to specify the role of society and culture in education. He insisted that as we are in knowledge age, so the main function of education should be promotion of the culture of knowledge creation (Bereiter & Scardamalia, in press). It is true that we live in an era of knowledge society, but can we say that the most important task of education is to internalize the cultural values of knowledge creation? However, it seems that from an educational point of view, not all educational goals may be reduced to knowledge work. But, Bereiter postulated that there are ample reasons why enculturation into a knowledge-building society is important for all students and not only those who may work with ideas professionally (Bereiter, 2002a; 2006; 2010). However, although Bereiter has contributed to the development of the concept of knowledge work, expecting all students to produce and improve knowledge may not be feasible. Therefore, such a loose conception of knowledge may lead to an invalid notion.

As mentioned above, Bereiter has tried to bridge between theory and practice by his PPK (principled procedural knowledge). He has clarified that PPK may be defined as “know-how” combined with “know-why” and has further explained that it is coherently justified procedural knowledge (Bereiter, 2010). However, it seems that the intention of Bereiter for bridging theory to practice is to bridge “learning sciences” to educational practice, as he referred to Sawyer’s (2006) emphasis on the emerging learning sciences who says “to better understand the cognitive and social processes that result in the most effective learning and to use this knowledge to redesign classrooms and other learning environments so that people learn more deeply and more effectively” (p. xi). But, what happens in Bereiter’s solution is that theory is reduced to science, and philosophy as a major theoretical domain is neglected. While Hirst reminded us,

Philosophy, like psychology, sociology and history, is an abstracting, academic, theoretical discipline that is a hugely significant instrument in contributing to the exercise of practical reason in educational affairs and the progressive experimental development of practices that best pursue that particular form of good in our complex society. (Hirst & Carr, 2005, pp. 615-632)

Bereiter’s Educational Ideas

The most important educational ideas of Bereiter are the foundation of education, role of learner, learning content, goals of education and teaching-learning process, some of which will be scrutinized in this section.

Foundation of Education

Bereiter believed that the foundation of education is knowledge building. He claimed that knowledge building is to reconstruct education (Bereiter & Scardamalia, 2007)—related efforts that makes enculturation of students with knowledge creation possible. Indeed, since Bereiter treated knowledge as a community property, rather than a mental content, and emphasized that collective work should focus on improving the knowledge itself, rather than improving the contents of students’ minds, knowledge building as he puts it is the “creation and improvement of knowledge of value to one’s community” (Bereiter, 2010, p. 8). He emphasized that even if only a limited number of students choose careers, such as knowledge creator, it can be argued that all citizens need “epistemological literacy”, or to use a less intimidating term, “knowledge literacy”, which means an understanding of how inventions and knowledge advances are made.

Role of Learner

The core of educational act is knowledge work, which is the work that increases the value of conceptual artifacts. In fact, knowledge work is done in knowledge society and a kind of society that is organized around knowledge production (Bereiter & Scardamalia, 2010). Thus, schools as a part of this society should be the productive body of the society. Hence, if students are to play their roles in the knowledge society, they must learn that their own ideas, no matter how satisfactory they may seem, are improvable, and that improving that knowledge is their job, not something that a teacher or mentor can be expected to do for them.

Learning Content

Though, subject matters are presented dogmatically or with the utmost openness to skepticism and debate, in most schools, knowledge is dealt with almost exclusive what we call "belief mode" (Bereiter & Scardamalia, 2003). However, Bereiter has distinguished two modes of thought: belief mode and design mode (Bereiter & Scardamalia, 2003; 2006). Belief mode comprises all discourse concerned with the fixation of belief, while design mode is the mode of creative knowledge work which includes invention, designing, planning and theory building (Bereiter, 2010). Therefore, the school curriculum should cover both and support recursive move between them. Thus, learning content should be treated in some cases in belief mode and in others in design mode.

Goals of Education

Bereiter (2002a, p. 55) said "I can show that a biologically more realistic theory of mind is better able to handle most of the major goals of education, especially teaching for understanding". Yet, Bereiter believes that deep understanding needs participation in knowledge creation. Thus, for Bereiter, educational goals could be searched for in knowledge building framework. Therefore, educational programs should provide students with opportunities to build their own knowledge through their own methods and as such, educational goals could be categorized in two levels: (1) knowledge goal (knowledge as information); and (2) production, creation and improvement of knowledge (students can build conceptual artifacts that could be called theories or at least qualified as "quasi-theories" (Chuy et al., 2010).

Teaching—Learning Process

Education, Bereiter believed, is a democratic act, and therefore, all human beings have the right to take part socially in knowledge building (Bereiter, 2010). In this socially important enterprise, progressive discourse plays a central role, and therefore, in education (i.e., teaching—learning interaction), the social action of dialogue would be the feasible way to achieve educational goals. Indeed, Bereiter, with reference to Popper who said that: "We can grasp a theory only by trying to reinvent it or to reconstruct it, and by trying out, with the help of our imagination, all the consequences of the theory which seem to us to be interesting and important" (Popper & Eccles, 1977, p. 461), considered "teaching and learning with understanding" as theory building.

The main points of Bereiter's educational ideas can be seen in Table 2.

Criticisms of Bereiter's Educational Ideas

If "cognitive revolution" implies radical changes in established beliefs about cognition and cognitive development, or our ability to think, we should redefine the groundwork of education. In traditional approaches to education and educational liberalism, education is founded on "justified knowledge", while Bereiter (2002a)

recognized knowledge building as the foundation of education. In his view, which was impressed by Popper (1972), knowledge is created by everyone, so we should have no justified knowledge in educational settings. In fact, he reduced the state of justified knowledge to initial information that people acquire to deal with knowledge work and consequently build knowledge.

Table 2

Bereiter's Educational Ideas

	Educational components	Ideas
1	Foundation of education	Cooperative knowledge building
2	Role of learner	Knowledge work (knowledge ability)
3	Learning content	Belief mode and design mode
4	Educational goals	Level 1—knowledge goal (knowledge as information) Level 2—production, creation and improvement of knowledge
5	Teaching-learning process	Progressive dialogue for knowledge building

According to Whitehead (1929, p. 83), "Education to be living and effective must be directed to informing pupils with those ideas and to creating for them those capacities which will enable them to appreciate the current thought of their epoch". Bereiter extended Whitehead's statement, saying that, "You cannot appreciate the current thought of this epoch unless you are an active participant in advancing it" (Bereiter & Scardamalia, 2003). However, this statement is dubious. It is obvious that too much time of students is spent on learning (to acquire the current knowledge), especially if they want to learn with deep understanding, the question is how we should organize school programs in order that knowledge work necessarily lead to improvement or creation of knowledge.

What seems to be learning content from Bereiter's point of view are the two states of thought represented in schools' subject matters. He pointed that difference between these two modes of thought is not a continuum.

Instead, it consists of two states or modes of activity, with the possibility of considerable switching back and forth. When in belief mode, we are concerned with what we and other people believe or ought to believe. Our response to ideas in this mode is to agree or to disagree, with presented arguments and evidences in order to resolve doubts. When in design mode, we are concerned with the usefulness, adequacy, improvability and developmental potential of ideas. (Bereiter & Scardamalia, 2007)

However, to decide what should be learned in schools, probably more attention should be paid to epistemological, cultural and political factors, so that it can be in either belief mode or design mode, depending on external components which cannot be controlled by the curriculum planner.

To work out a vision for education in a knowledge society, at least requires accounting for knowledge in two quite distinct senses: first, knowledge as something that people acquire and that becomes part of them; and second, knowledge as something that they work with and that in some sense takes on a life of its own (Bereiter, 2002b, pp. 11-34). By this categorization, Bereiter (2002b) was talking about two levels of goals. However, it seems that the concept of goal is more complicated than being described by different levels of knowledge. In fact, the purpose of education is to promote good life by cultivating virtue, not creating knowledge.

Since Popper and contemporary socio-culturists are in firm agreement about the importance of dialogue in promotion of science and other disciplines, Bereiter (2002a) has contemplated dialogue as the most important process in educational practice, as he believes knowledge can only be improved by "progressive discourse". He believed that discourse plays an important role in all human communities which obviously would be different

in diverse communities. However, Bereiter said, "Our particular concern here is with communities whose job is creating and improving knowledge" (Bereiter, 2002a, p. 84). Nevertheless, it seems that: At first hand, the concern of education is something more than knowledge building; and at second hand, we would face the fundamental challenge of development of culture of discourse and institutionalize dialogue in education as the main process.

Conclusions

In short, Bereiter (2002a) considered "cognitive education" as the relationship between mind, knowledge and education, which presents an alternative approach in light of cognitive science, replacing folk theory. However, there is a concern that since the focus of cognitive scientists is on computation and representation theories, they may fall into reductionism. Bereiter (2010) has himself attended to this criticism which is concerned with reducing human beings to information processors. He noted that, "Learning scientists do not, by and large, need to be reminded that human beings are different from computers" (Bereiter & Scardamalia, 2010).

Bereiter (2009) believed that not only behavioral scientists and philosophers, but also educationists engaged with mental processes need to deal with the concepts of mind and knowledge. Thus, talking about mind, knowledge and correlation between them will not remain only in the sole province of philosophers.

In this article, we examined Bereiter's educational notion in two ways: his philosophical assumptions and his educational ideas extracted from the prior. He believed that we should redefine our conception of mind, knowledge and education by relying on cognitive science. It seems that his emphasis on the above components is because educational decisions are solely made based on what we have in our minds. However, whether cognitive science would be able to make this commitment or not is in question. Anyway, Bereiter's educational ideas have a relatively coherent structure, but its implementation in real situations may face intractable problems.

The major difficulty of Bereiter's philosophical assumptions is his distinction between Worlds 2 and 3. Popper developed the triple world as his epistemological approach and Bereiter used it to develop his own educational theory as knowledge building. As such, the essential problem of his educational notion is that of extension of knowledge creation to all students, obviously without verifying its feasibility. Moreover, although he relied on cognitive science, but failed to specify how education could be informed by that interdisciplinary field. Anyway, in spite of the fact that Bereiter appropriately identified educational issues arising from folk theory and introduces ideas on how to improve educational thoughts and how to reform educational systems, some of his ideas, such as focusing on knowledge creation instead of learning, seem to be impractical.

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